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New Wine in Old Bottles***

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Socioeconomic Complexity and the Sociological Tradition: New Wine in Old Bottles?

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Abstract Complexity is a purposeful integrating framework for interdisciplinary dialogue, namely between sociologists and economists. After presenting some properties of complex (social) systems, we consider the crucial role of the economic complexity research agenda in challenging the mainstream economic paradigm. This endeavor, we suggest, can greatly benefit from a neglected but relevant aspect, the concern regarding social complexity implicit in the sociological tradition, particularly the emphasis given by Durkheim to the idea of interdependence, a keystone of complexity studies nowadays. As we underline, instead of assuming interdependence/complexity and autonomy/simplicity in a tradeoff relationship, the French sociologist takes interdependence and autonomy as fundamentally complementary and positively correlated characteristics of modern societies. This fact suggests the convenience to conceptualize complexity as a broad socioeconomic, and not just a strict economic, phenomenon. Such a purpose is certainly more damaged than benefited by the existence of the economics/sociology academic divide.

Keywords: Socioeconomic complexity, interdependence, autonomy, sociological tradition, Durkheim

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INTRODUCTION

This paper is about the meaning and importance of the notion of socioeconomic complexity as a purposeful integrating framework for interdisciplinary dialogue between sociologists and economists.

Originating in the physical and biological sciences (at least in terms of its explicit consideration), the notion of complexity has extended to several branches of social and human sciences, namely economics and sociology. Interdisciplinary by its inherent nature, the economic content of this notion may well be enriched by certain intellectual facets belonging to the sociological tradition. Such plausible examples include: a) the changing forms of preserving solidarity within the social division of labor context, b) the theoretical possibilities and limitations of the community-society antinomy, c) problems emerging from social differentiation and their relationship with increasing moral individualism, d) problematic articulations within the pair of trends formed by social differentiation and social inequalities.

A number of these issues, as recently considered in economic theory, to some extent overlap with fields of interest typical of long-established sociological obsessions. However, there are also important differences between the economic and sociological approaches to complexity, mainly originating in the specific ways the *forma mentis* of each one, as well as the corresponding intellectual toolkits, are produced within the respective academic fields.

Both the differences and the overlapping elements are to be highlighted in this paper. The main points here are: a) whereas in economics complexity is a challenging

novelty, very much questioning the physics-inspired assumptions of traditional mainstream discourse, in sociology it seems to be an ever present (if not explicit) and crucial element of analysis; b) whereas in economics the relationship between interdependence and autonomy is typically thought of as a tradeoff one, in Durkheim's sociology it is mostly considered in terms of reciprocal propitiation and reinforcement. At any rate, so we think, the concept of interdependence, a keystone of complexity studies, might well create a very interesting scope for dialogue between sociologists and economists.

The paper is organized as followed. After briefly discussing the difficult task of defining complexity in a general sense and resuming some important properties of complex (social) systems, it points out the crucial role of the economic complexity research agenda in challenging the mainstream economic paradigm, to which it is not yet but may eventually represent a solid alternative (section 2). In the third section, a contribution is made towards uncovering a neglected but relevant aspect of complexity in broad terms, that is, the implicit concern with social complexity adopted by the sociological tradition and particularly in Durkheim's work, mostly associated with the fact that Durkheim treats interdependence and autonomy as positively correlated and logically reinforcing traits of modernity. Section 4 concludes by discussing some potential connections between the economic and sociological approaches to complexity that seem to open up a promising interdisciplinary research agenda on the important notion of socioeconomic complexity, and in addition it identifies certain constraints on progress.

COMPLEXITY IN SOCIAL AND ECONOMIC SYSTEMS

Complexity is indeed a concept with a great variety of meanings and a great number of definitions. Without any intention of exhausting the subject², and for instance we may refer to computational complexity, which according to Gell-Mann (1995) is concerned with how long it takes a standard universal computer to perform a particular task. We can also take the more common concept that (again in Gell-Mann's view) relates complexity to the length of a concise description of any given entity (Gell-Mann and Lloyd, 1996). Macro-social systems are certainly complex in this latter sense.

After considering complexity as a key characteristic both of the world we live in and of the way we perceive it, and notably the socio-economic world, Delorme (2001) presents the broadly shared following notion: a system is complex when it cannot be satisfactorily explained by a mere understanding of its component parts.

Along the same lines Durlauf (2003) considers that a system is said to be complex when it exhibits some type of order as a result of the interactions of many heterogeneous objects. Such systems display and may be appropriately identified by the following properties: nonergodicity, phase transition, emergent properties and universality.

The emergence of structures and the unfolding of patterns result in viewing the economy as process dependent, organic and evolving rather than deterministic, mechanistic and predictable. An interesting example (see Arthur et al, 1997) is the

² As noted by Horgan (1997, p. 305), a well-known sceptic about the complexity approach to economics, Seth Lloyd has gathered at least 45 definitions of *complexity*. For a contrary, more sympathetic position, see Rosser (1999).

functioning of stock markets in which booms and crashes in prices are a frequent feature resulting from rule-of-thumb behavior interacting to determine individual purchasing decisions. The crucial forces leading to economic complexity of this kind are interactions and positive feedbacks between individual actors, conceptualized as decision makers whose choices depend directly on the decisions of others.

Interactions between large numbers of parts create a state of affairs that is not easily describable unless we resort to aggregation methods that in most cases are clearly unsatisfactory (for a discussion about the problems of aggregation and dynamic systems see Shpak et al. 2003).

A heuristic conjecture can be derived from the above definitions of complexity: a dynamic social system that is more complex as a static set of interactions is not only more complex in the Gell-Mann sense but probably also more complex in the dynamic sense (Amaral, 1999). This is only a heuristic proposition that may prove useful in social system analysis (for its application in an input-output context, see Amaral et al. 2007).

If we accept this conjecture, the study of patterns and of the interactive intensity between the parts of a system represents an important issue within complexity since it helps in understanding the dynamic system behavior. This conjecture fits perfectly with one of the most well known definitions of complexity: a system is complex when it is characterized by process and emergence in which components adapt to the world, that is, the aggregate pattern they co-create: as elements react, the aggregate changes, as the aggregate changes, elements react anew (Arthur 1999). Although our purpose in this paper is not to prove or verify this conjecture, we will however highlight the need to qualify it (see *infra*).

Different from mainstream economic theory, with individuals only interacting via market clearing prices, the so-called “complexity” view of economics seems to accommodate important dimensions long since of central concern in sociological and psychological traditions, for example, conformity effects (“an individual’s perceived benefit from a choice increases by the percentage of his or her friends making the same choice”) and role model effects (“choices by members of one generation influence choices made by the next generation”). As Durlauf (1997) interestingly puts it, many of the efforts to introduce more realistic psychology and sociology into economic theory operationally are efforts to incorporate positive feedbacks of various types.

Confronting a mainstream approach to economics based on equilibrium, optimization, universality and *single, narrow disciplinarity*, the social interactions study of complexity puts emphasis on process, emergence, learning, novelty, institutions, organic interdependence, bounded rationality, history, path dependence, context, and *interdisciplinarity* or, as preferred by Rosser (2008), *transdisciplinarity*. Most of these ideas indeed punctuate several previous contributions to the history of economics. That they are being brought back into the central stage of this discipline is surely good news for alternative strands of evolutionary, institutional and behavioral economists, not to mention sociologists and other social scientists.

In economics, one of the most representative and promising research agendas along complexity lines is based on what are termed agent based computational economic models (ACM) exploring the dramatic increase in computer power to explicitly deal with the interactions of large numbers of heterogeneous learning agents (see, e.g. Colander 2006, Colander et al. 2008 and LeBaron and Tesfatsion 2008).

Another interesting agenda is also the “institutional” policy approach, dealing with co-ordination problems (Elsner, 2005).

Henceforth we pursue a different approach, incorporating the value potentially added by returning to (and elaborating on) the concerns with complexity implicit in the works of the great thinkers of the sociological tradition, particularly Durkheim. The keystone idea we underline in this author’s work concerns the fact that, in his most famous *opera* on social division of labor, the French sociologist emphatically *treats interdependence and autonomy as two reciprocally reinforcing elements*, whereas in the economic approach to complexity these tend to be assumed in a tradeoff relationship. This makes us reconsider Amaral’s heuristic conjecture. In fact, a system may reveal a greater dynamic complexity in spite of not verifying a greater static complexity, at least in the sense that directly opposes complexity (or interdependence) to autonomy. This fact suggests the need to conceptualize complexity as a broad socioeconomic, and not just a strict economic, phenomenon.

COMPLEXITY AND THE SOCIOLOGICAL TRADITION

Complexity as such cannot be said to be a common issue in sociological research but that considered by Durlauf (1997), probably one of the first papers on economic complexity, is indeed a classic example in sociological literature, namely the emergence of racially segregated neighborhoods from a collection of individuals with different preferences for community racial composition (Schelling, 1971).

Another interesting example of socioeconomic complexity is the El Farol Bar Problem of Arthur (1994) in which every person must independently decide each week whether to show up at their favorite bar according to their prediction of other people’s decisions. Also deserving attention are the cascade effects of Granovetter

(2003) as well as the agent based computational models of Axelrod (1997), among many others.

Indeed, even without an explicit formulation — and that is our main point here — *socioeconomic complexity has long since been a central theme in classical sociological thought*. Take, as a representative example, the work of Émile Durkheim. As is well known and often mentioned, but not always properly considered, in what is probably one of the most effective demarches in sociological tradition Durkheim (1893) radically changed the adjectives (and implicit evaluations) used by Ferdinand Tönnies in his classic antinomy of “community” and “society”, or *Gemeinschaft* and *Gesellschaft*. The first, referring to traditional societies, was supposed to be connected with *Wesenwille*, “essential” or “organic” will, whereas *Gesellschaft*, the very essence of modernity, was associated by Tönnies with *Kürwille*, that is, “arbitrary” and “calculative” will.

The qualification of “organic solidarity” referred to modern societies, with “mechanic solidarity” being left to traditional forms of social life, therefore corresponded to a drastic move by Durkheim. Among meanings susceptible of being attributed to these qualifications, and therefore also to Durkheim’s demarche, it seems worth precisely highlighting the awareness that the French sociologist had of the scale of *increase in complexity* associated with the aforementioned change.

According to Durkheim, let us remember, the idea was to acknowledge not only the aspect of spontaneity and normality of the group of processes associated with a growing division of labor, but also, and quite importantly, the normality and even essential desirability of a crescent dimension of self-consciousness, i.e., reflexivity, and individuation in general terms connected with what is usually designated as modernity (cf. particularly 1893, Conclusion).

These growing individuation and reflexivity, it should be noticed, were thought of as simultaneously causes and consequences of a rising interdependence in the parts of the social whole, that is, of an equally crescent “moral density” of societies – which he of course took the care to consider as a process, without any definable limit, and not as any fully consummated reality.

The simultaneity of these processes of ever growing interdependence and individuation/reflexivity would be, and still in accordance with Durkheim, associated to undeniable zones (or “moments”, if one chooses to use Hegelian jargon) of tension, that is, of tradeoffs in the relations between the two terms, greater individual autonomy bringing a looser bond with the social totality, and reversely (idem, Book III). But the important trait to underline above all else is that, according to the French sociologist, the most fundamental character of the relationship between the two terms was not supposed to be that of tradeoff but one of reciprocal reinforcement, a greater individuation propitiating in return a greater densification of interdependences. (For an essay on the identification of parallelisms between Durkheim’s and Hegel’s works, cf. particularly Gangas 2007.)

In other terms, and as always happens when the cause is effect and the effect cause, the growth of social interdependences may well be thought of as a growth in social complexity, simultaneously transforming society as a whole and each one of its member individuals into intrinsically open-ended realities, escaping from any exact or defined determination except precisely the determination of a rising complexification, that is to say, somehow (and to now make recourse to another philosophizing jargon) “condemned to be free”.

True, let us repeat, the “moment” of tradeoff is not completely elided. Zones of conflict remain and are besides explicitly recognized as such by the French

sociologist: possible *tedium vitae* implied by the “egoism” that moral individualism may transport with itself, “anomie” that permanently risks being inserted into the growth of personal fulfillment expectations opened up by the very process of complexification and its incompleteness.

Yet, and not least importantly, Durkheim’s deepest persuasion or background assumption is that these are two reciprocally reinforcing, and not oppositional, processes. It is certain that the variety of individualism expectable in modern societies, or capable of being related to a condition of normality, is that of an individualism itself already profoundly “moral”, that is to say, object (and besides also agent) of a process of modifications that with a certain liberty we may identify with what was named by Norbert Elias (1994) as the “civilizing process”. The individualism that is characteristic of modern societies, or “organic” solidarity, Durkheim insists once and again, is already a moral variety of individualism, by no means sheer egoism (which is still identifiable as one of its possible degenerations).

For the French sociologist, it is therefore not about discovering the “spontaneity” of a so-called “inner I” sometimes equivocally identified (following the tradition of a certain literary Romanticism) with some pre-social “nature”. Acknowledging the importance of the spontaneity, the subjectivity and the “purity of intentions” that in general terms were associated with the Kantian tradition of philosophical discussion of morality, besides subscribing to positions fundamentally susceptible of being considered anti-Utilitarian in matters of moral philosophy (that is: asserting the irreducibility of morality to any calculus of utility³), Durkheim still

³ Although Durkheim disagrees both of Utilitarian and of strictly Kantian notions of morality, he clearly rates Kant in a higher level than Utilitarian philosophers (cf. passim Durkheim 1903: 24, 73-85). The fact that Kant was supposed to be the very example of the philosopher conscious of the basic “antinomies” of morality, namely the one opposing autonomy and heteronomy, somehow promotes

sustains that the deepest authenticity, clearest conscience and generally speaking greatest moral richness supposedly characteristic of modernity are already the result, or the cultural deposit, of an entire series of changes of which society was simultaneously subject and object, and that we can properly consider as cumulative, i. e., as true progress.

This is, besides, a matter sufficiently rich in implications to justify a comparison, however brief, with another tutelary figure from the sociological tradition. We are referring to Max Weber, to whom, as is well known, the full set of processes usually associated with the sedimentation of modernity was supposedly identifiable with a loss of “spirituality”, a “disenchantment”, a growing prevalence of merely objective trends, a certain form of leveling-by-below of the entirety of existence that would also tend to be a suppressor of no matter what kept *standing*, of all that tried to be simultaneously creative and recognized as a distinct reality, different from everything else and somehow (maybe inevitably) “above” everything else – of all “style”, that is.

While for Weber the generality of processes associated with modernity, also signifying growing social interdependence, were supposed to mostly mean loss of soul, “mechanization” (“iron cage”, etc.) and correspondingly also a loss of individuality, which is expressed in the famous passage invoking Goethe and the alleged contemplative wisdom and “renunciation” vis-à-vis the presumed tragic inevitability of the prevalence of professional ethics and specialization (cf. particularly Weber 1983: 180-1), for Durkheim, we may say, the historic rise of the

him to the position where Durkheim suggests the need for an insurmountably “religious” element in social life, society obviously being the very focus of that element, as he sustains in his late work *Les Formes Élémentaires de la Vie Religieuse* (1912).

figure of the *Berufsmensch* lies very far from expressing any threat to the *Mensch*, rather on the contrary. To tell the complete truth, we must acknowledge the fact that Durkheim also insists on the necessity of a moral discipline and a moral education capable of forming men and citizen apt to take up professional positions and seek their self-fulfillments while professional, and therefore in a sense limited, self-fulfillments (cf. Durkheim 1903: 34 and seq., 177 and seq.; 1922: 4-5, 37 and seq.). However, what is central is that according to Durkheim this trait is closely associated with, and indeed to a large extent is the same as, the process via which both society and individuals obtain greater “moral density”. Hence, if it may occasionally make sense to think of the two terms (moral enrichment of society and individuals) in a tradeoff type of relationship, the deepest connection between the two is no doubt one of mutual reinforcement.

On the basis of these different (and to some important aspects even fully and directly contrary) readings of Goethe’s *Wilhelm Meister’s Journeyman Years*, there is understandably also a non despicable set of differences in terms of doctrinaire leaning, with political ramifications that would be foolish to duck. Behind Weberian cogitations, it is probably not so much Goethe who shows up, rather Schopenhauer and Nietzsche with the correlate beliefs concerning the leveler (and nullifying) effect of the rising predominance of professional ethics (cf. Losurdo 2004: 133-50, 215-24) – unless, of course, a group of elite beings could oppose this “going-Chinese” trend in a campaign of regeneration and self-transcendence capable of somehow identifying them with their most profound calling, or rather with the correspondent variety of that “group of instincts we call «life»” (Nietzsche 1973: Chapter Nine, aphorism 258), aiming precisely at a fully accomplished existence, explicitly thought of as excess, *luxus*, absence of any purpose other than the so to speak self-purpose and consciously

placed over and above a multitude of men-of-profession with these, on the contrary, fundamentally hetero-oriented and hetero-justified.

Essentially different were the doctrinaire horizon and political orientations of the French republican *clerc* Émile Durkheim. Not only does he take division of labor as associated with crescent individualism and moral densification, these are in turn distinguished from social inequality with Durkheim taking pains to warn of looming dangers of “anomic” and “forced” divisions of labor. In practice, considering both the problems of social inequalities and the currents of socialist thought responding, Durkheim went quite far in acknowledging the need for broader state intervention in the economy as a safeguard of both individual liberties and fair equality of opportunities. The state was for him the expression of society’s conscience and will, a true “collective ego” (cf. Giddens 1971: 98-100), and his motives for parting from the contemporaries streams of socialist thought lay mostly in the fact that these were allegedly not only the expression of the “cult of the individual” (which was supposedly a good thing: the strength of the state as a guarantee of the liberty of each and all), but also of the Utilitarian variety of individualism, and actually egoism, which was most typical of the economist’s frame of mind. Therefore, and according to Durkheim, his contemporary socialists were not equipped with an intellectual package capable of an in-depth challenge to the dominant “egoistic” world-views only able to be transcended through a strong emphasis on moral education and a rehabilitation of professional associations (Giddens, 1971: 101-4, 115-8, 224-32).

But the most important facet to underline here is how Durkheim’s particular interpretation (and evaluation) of the so-called *Bildung*’s tradition, now explicitly conceived as a simultaneously professional and integral “formation of the individual”,

also expresses, perhaps because “each man is Humanity”, the core of his thought concerning the evolution of the whole of society:

a) During his process of self-civilization, each individual undergoes a set of transformations that can properly be conceptualized as growing complexification: he gets integrated into an ever tighter fabric of interdependences, which in the meantime, far from engulfing him or threatening him while a distinct reality, actually leads him to an ever more acute awareness of precisely that uniqueness.

b) On the other hand, if truly he gets parted from the naturalist predominance of instincts or sensibility, at the same time his increasingly moral nature induces in him the ascendancy of another kind of sentiments with which he tends to identify himself, or more precisely to identify his “deepest I”, clearly thought of and experienced as a superior or “transcendental I”. This thereby also boosts, so to speak, the density of subjectivity associated with existence, notwithstanding the noticeable fact that these sentiments are indeed, according to Durkheim, one of society’s multiple avatars.

c) Finally, if growing social differentiation implies for certain aspects a dimension including the production of inequalities, at the same time for other aspects it induces a reduction of inequalities. More importantly, these inequalities tend to be accepted only inasmuch as they are recognized as intrinsically moral, that is to say, fundamentally dependent on the achievement and merit of each individual, measurable according to objective, universal criteria, and not on factors such as circumstances of birth, whims of Lady Luck, and in general all that might be conceived as only *fatum*: either expression of a “blind”, objective necessity, or as a simple “must” paradoxically resultant of an absence of cause, *a-caso*, randomness – at any rate, not a reality provided with moral value, i.e., justifiable by the “General Interest” and, in that sense, susceptible of being wanted by the “General Will”.

Thereby, each individual's life tends to be translatable into what one should likely call a self-civilizing process, certainly unfinished, obviously facing various possible paths of evolution, predominantly identifying itself with the reality of each and every one as a conscious subject or "absolute I", and yet consciously part of a wider process, into which he furthermore gets integrated in a potentially (but not necessarily) harmonious fashion. There seems to be far less ground for speaking of any definite or tragic "renunciation", as in Weber's reading of Goethe, since modernity is in its final analysis morally richer than previous eras. Instead, the German poet insinuates into Durkheim's work in a rather more prosaic way, since the famous Faustian "longing", or wanting everything and nothing in particular, or more precisely inclination to do everything and nothing in particular, is identified by the French sociologist with a pathological condition, *anomie*, not with modernity itself or some "modern condition" (cf. Durkheim 1897: 128; 1903: 34, 177).

Thus, correspondingly, we can even state that society in its whole tends to be conceived not as some dead reality but rather somehow as an *anima mundi* of pantheistic inclination, gaining full self-consciousness to the extent that it creates itself via conscious human action (for a vision akin to this, but referring it to Hegel's work, cf. Marcuse 1999). The predominance of individuality here is not the opposite of holistic leaning, rather these two terms are reciprocally propitious and mutually reinforcing.

CONCLUDING REMARKS

Socioeconomic complexity: does this concept really hold water? Does it really matter? One should first of all mention the existence of what may probably be referred to as a diffuse awareness among some prominent economists of a tradition in

other social sciences of *thinking in terms of complexity*, even when that fact is not fully and explicitly mentioned or referred to directly as complexity.

On the other hand, the aforementioned case of Durkheim and the brief contrasts with Tönnies and Weber seem to indicate both the evidence of the existence within the sociological tradition of plenty of material to provide the basis for a sociologically inspired discussion of complexity issues, and also the presence of *a number of elements that tend to prevent*, or at least make it harder, *the full recognition of these cultural riches and their importance*.

Let us, for a few moments, contemplate on the usual classification of Durkheim as a “positivist” sociologist (very often without even a minor qualification of that term) in contrast with Weber’s proclaimed “comprehensive” approach to social realities before then considering: a) the differences described in their deep mental frameworks relating to modernity, moral individualism and professional ethics, b) the further divergences in their attitudes towards mainstream (i. e. neoclassical, marginalist) economics. As is very well known, not only did Weber ignore and/or despise the projects to morally tame economics that Durkheim’s work somehow gave rise to (Simiand, Halbwachs, Mauss, etc.), what is more he explicitly and emphatically acknowledged the convenience of the academic predominance of marginal-calculus-based economics, at least as regards study of the economy, and invited other academics to follow his example (for an encomiastic vision of this Weberian attitude towards economics, cf. Swedberg 1998).

To what extent was this rend-Caesar-what-is-Caesar’s position toward disciplinary divides itself already suggested by a physics-inspired consideration of economic problems? We presumably cannot, alas, but wonder. The undeniable fact is, of course, that Weber’s celebrated leaning towards rational indeterminacy (or rather

irrational determinacy) of ultimate values, his very much known conflict-of-the-gods type of attitude towards “axiological” issues (cf. particularly Aron 1967: 527)⁴ propitiated and indeed enhanced the alleged “value-free” kind of inquiry that still now forms the back bone of current, mainstream economics.

On the other hand, the dominant selective group of readings from the founding authors of sociological tradition, still owing much to Talcott Parsons and his “classical” interpretations, very much reinforced this attitude of academic disciplinary divide, indeed almost schizophrenic separation, which clearly tends to inhibit global discussion and understanding of this group of problems (cf. Graça 2005 and 2008).

Notwithstanding this, the fact remains that the potential continues to exist of a cross fertilization of ideas coming from both economics and sociology, and not to mention other social sciences, which would likely reconsider some aspects of Durkheim’s ideas and the tradition of their appropriation by mainstream sociology, somehow integrating the above mentioned ideas in order to result in a new synthesis of social theory locating itself under the auspices of the idea of complexity. Through to the present day there are underestimated, where not almost unknown or broadly misunderstood facets of Durkheim’s work that would be likely to make an excellent contribution to that end.

⁴ This “agonistic” vision of the “conflict of values”, that is, the idea that values each stand in a quasi tradeoff relationship but with no possible universally valid criteria of choice between them, is also present in Isaiah Berlin’s notion (1969: 118 and seq.; 1980: 25 and seq.) that an unsolvable conflict exists between “ancient” and “modern” notions of liberty, or “pagan” and “Christian” world-views, the merit of Machiavelli’s work consisting precisely in highlighting these conflicting aspects. Berlin acknowledges that his ideas are largely a tributary of those of Benedetto Croce and Friedrich Meinecke on these matters. He could, of course, have also added Carl Schmitt (but did not).

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